

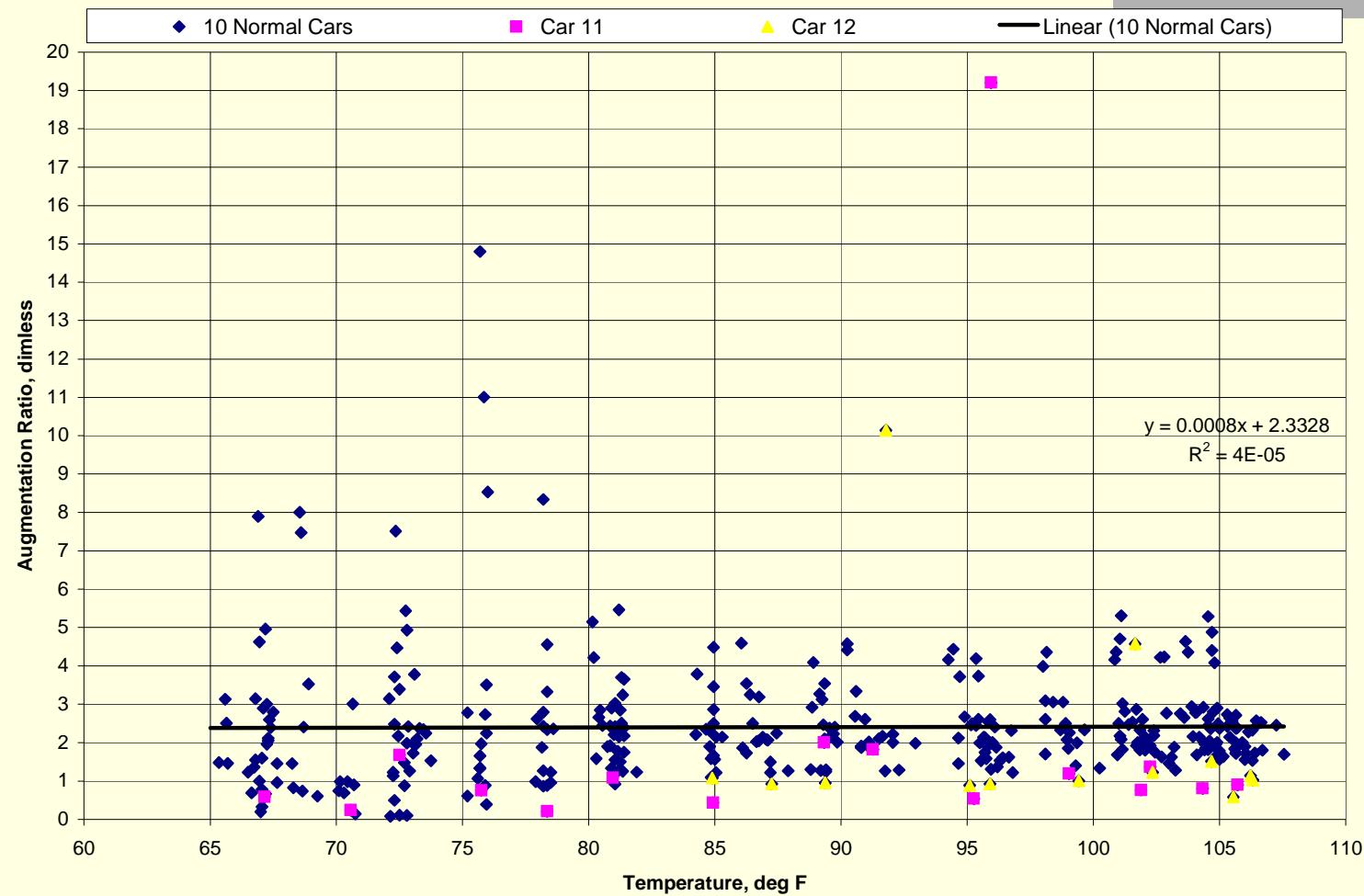
Emissions Inventory Workgroup

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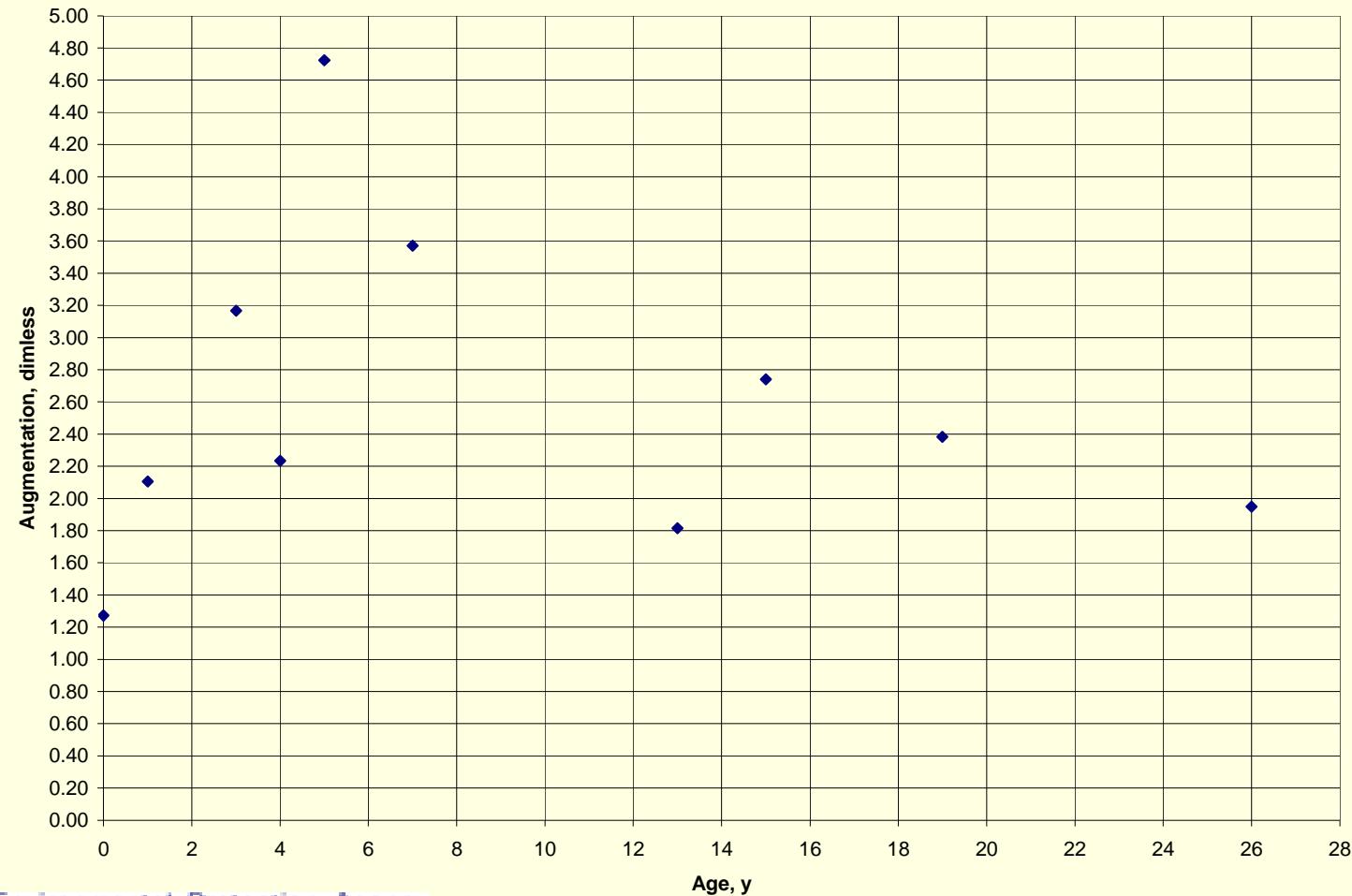
Overview

- Treatment of E65-3 Data
- Fuel Temperature vs Ambient Temperatures
- Simplification of ARB modeling approach

Augmentation Ratio Normals with E65-3 Data



Augmentation Ratio Normals Trend



E65 E65-3 Results

MY	MTBE g/d	EtOH g/d	Gaso g/d	Age y		delta g/d	ratio
2004	0.033	0.042		0		0.01	1.27
2004	0.048	0.101		1		0.05	2.10
2001	0.2	0.76	0.22	3		0.52	3.17
2000	0.6	1.43	0.58	4		0.79	2.23
1999	0.3	1.37	0.33	5		1.08	4.72
1997	0.6	2.25	1.13	7		1.62	3.57
1995	9.2	11.65	11.81	9		2.45	1.27
1993 *	3.7	4.89	3.72	11		1.19	1.32
1991	1.2	2.25	1.91	13		1.01	1.81
1989	1.0	2.63	0.82	15		1.67	2.74
1985	2.0	4.67	1.77	19		2.71	2.38
1978	1.9	3.74	2.3	26		1.82	1.95
	20.9	35.8	24.6	113	tot g/d	14.9	2.38
	1.7	3.0	2.5	9	g/d avg	1.2	1.72
	72.4	124.2	102.5		mg/h	51.8	
10 normals	8.0	19.2			tot g/d	11.3	
	0.8	2.4			g/d avg	1.1	3.02
2 moderates	12.9	16.5	15.5		tot g/d	3.6	
	6.5	8.3	7.8		g/d avg	1.8	1.28

SCAB 2010 by age or tech group

Difference: Separate Category for Zero-evap.

0.4 tpd x ¼ x ½ = 0.05 tpd lower.

¼ is fraction of 2004+ emissions zero-evap. ½ is 1.2 / 2.55

California 8-h O3 DV Temperatures		All Gasoline						
		Tech 1	Tech 2	Tech 3	Tech 4	Tech 5	Tech 6	All
SCAB								
2010	tpd	1.4	1.6	2.2	7.8	4.1	0.7	17.9
Diurnal Perm MtBE	tpd	0.1	0.1	0.1	1.7	0.2	0.1	2.2
Running Loss Perm MTBE	tpd	0.1	0.0	0.1	0.8	0.4	0.1	1.5
Hot Soak Perm MTBE	tpd							
Diurnal Perm EtOH	tpd	1.6	1.9	2.8	10.6	6.3	1.1	24.4
Running Loss Perm EtOH	tpd	0.1	0.2	0.2	2.3	0.2	0.1	3.1
Hot Soak Perm EtOH	tpd	0.1	0.0	0.2	1.1	0.5	0.1	2.1

SCAB 2010 by emission regime

Difference: Lump Zero-evap and Near-zero Evap in with normals

= 5.0 tpd x 6% = 0.3 tpd decrease. 6% is 2.4 instead of 2.55.

Cal 8-h Temperatures									
2010 SCAB									
Total Gasoline									
Tech 1,2,3,4,5,6									
		Ph 2 Gaso w/MTBE				Ph 2 Gaso w/EtOH			
		Normals	Moderates	Liq Lkrs	Total	Normals	Moderates	Liq Lkrs	Increase
No of Vehicles	veh-mi/d	9,576,611	2,524,822	266,654	12,368,088	9,576,611	2,524,822	266,654	12,368,088
VMT	veh-mi/d				440,537,934				440,537,934
No of Trips	no/d				82,893,146				82,893,146
Diurnal	ton/d	5.3	14.3	11.6	31.2	10.3	15.4	12.0	37.7
Diurnal	g/d/unit	0.5	5.1	39.5	2.29	1.0	5.5	41.0	2.77
Diurnal Permeation	g/d/unit	0.3	2.0	30.6	1.31	0.8	2.4	32.1	1.79
Running Loss	ton/d	8.3	60.9	7.7	77.0	9.0	61.2	7.8	77.9
Running Loss	g/mi	0.03	0.34	1.91	0.16	0.03	0.34	1.92	0.16
Running Loss Permeation	g/mi	0.001	0.007	0.151	0.005	0.003	0.008	0.158	0.006
Hot Soak	ton/d	1.2	8.1	9.5	18.9	1.7	8.2	9.6	19.5
Hot Soak	g/trip	0.02	0.75	4.98	0.21	0.10	0.75	5.00	0.21
Hot Soak Permeation	g/trip	0.00	0.03	0.44	0.016	0.01	0.04	0.46	0.023
Totals	ton/d	14.9	83.3	28.9	127.1	21.0	84.8	29.4	135.1
Diurnal Perm	ton/d				17.9				24.4
Running Loss Perm	ton/d				2.2				3.1
Hot Soak Perm	ton/d				1.5				2.1

Liquid Leakers

0.5 tpd 1.05
0.2 tpd 1.02

Method Summary

$$ER_{\text{etoh}} = ER_{\text{mtbe}} * (\text{PERMfr} * \text{EtRFG2r} + 1 - \text{PERMfr})$$

Where:

ER = Emission Rate, g/h

EtRFG2r = Augmentation Factor

= Emissions on EtOH fuel/Emissions on MTBE fuel

PERMfr = Frac Evap from Permeation

= 0.9 * Resting Loss/Process Emission rate

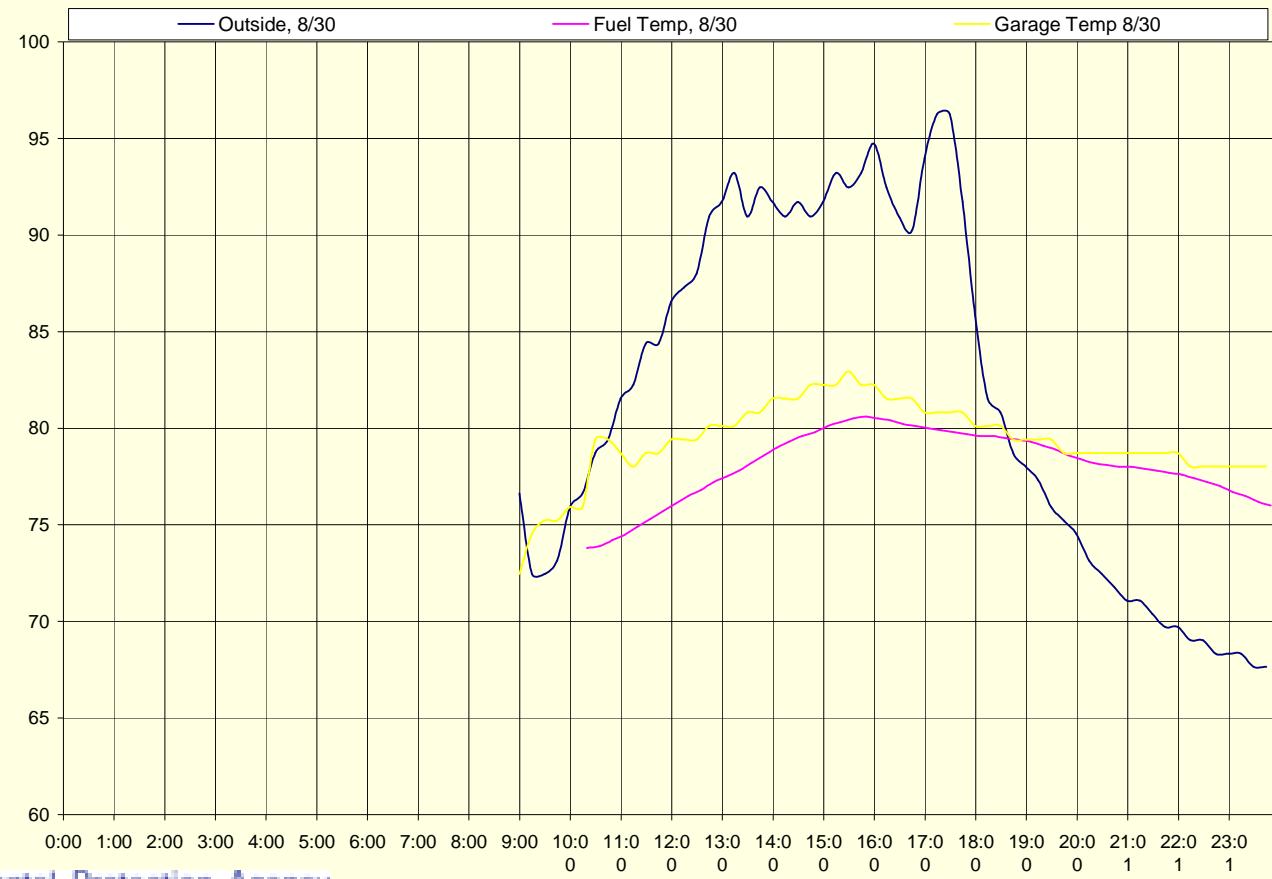
Method Summary

$$\begin{aligned}ER_{\text{etoh}} &= ER_{\text{mtbe}} * (\text{PERMfr} * \text{EtRFG2r} + 1 - \text{PERMfr}) \\&= ER_{\text{mtbe}} * \frac{0.9 * \text{Resting} * \text{EtRFG2r} + ER_{\text{mtbe}} - ER_{\text{mtbe}} * 0.9 * \text{Resting}}{ER_{\text{mtbe}}} \\&= 0.9 * \text{Resting} * (\text{EtRFG2} - 1) + ER_{\text{mtbe}}\end{aligned}$$

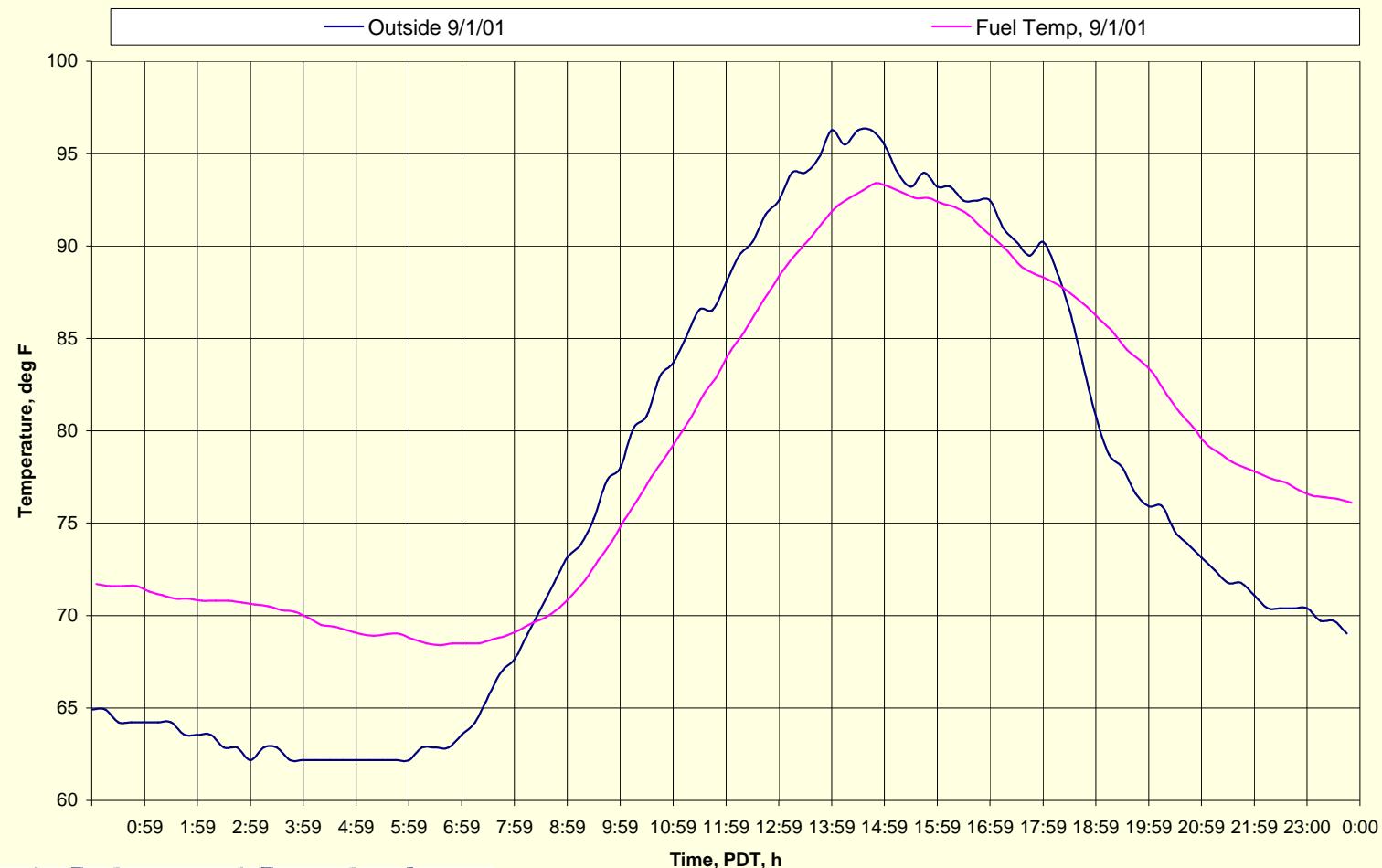
$$\Delta ER = ER_{\text{etoh}} - ER_{\text{mtbe}} = 0.9 * \text{Resting} * (\text{EtRFG2} - 1)$$

$$\text{EtRFG2r} = \frac{\Delta ER}{0.9 * \text{Resting}} + 1$$

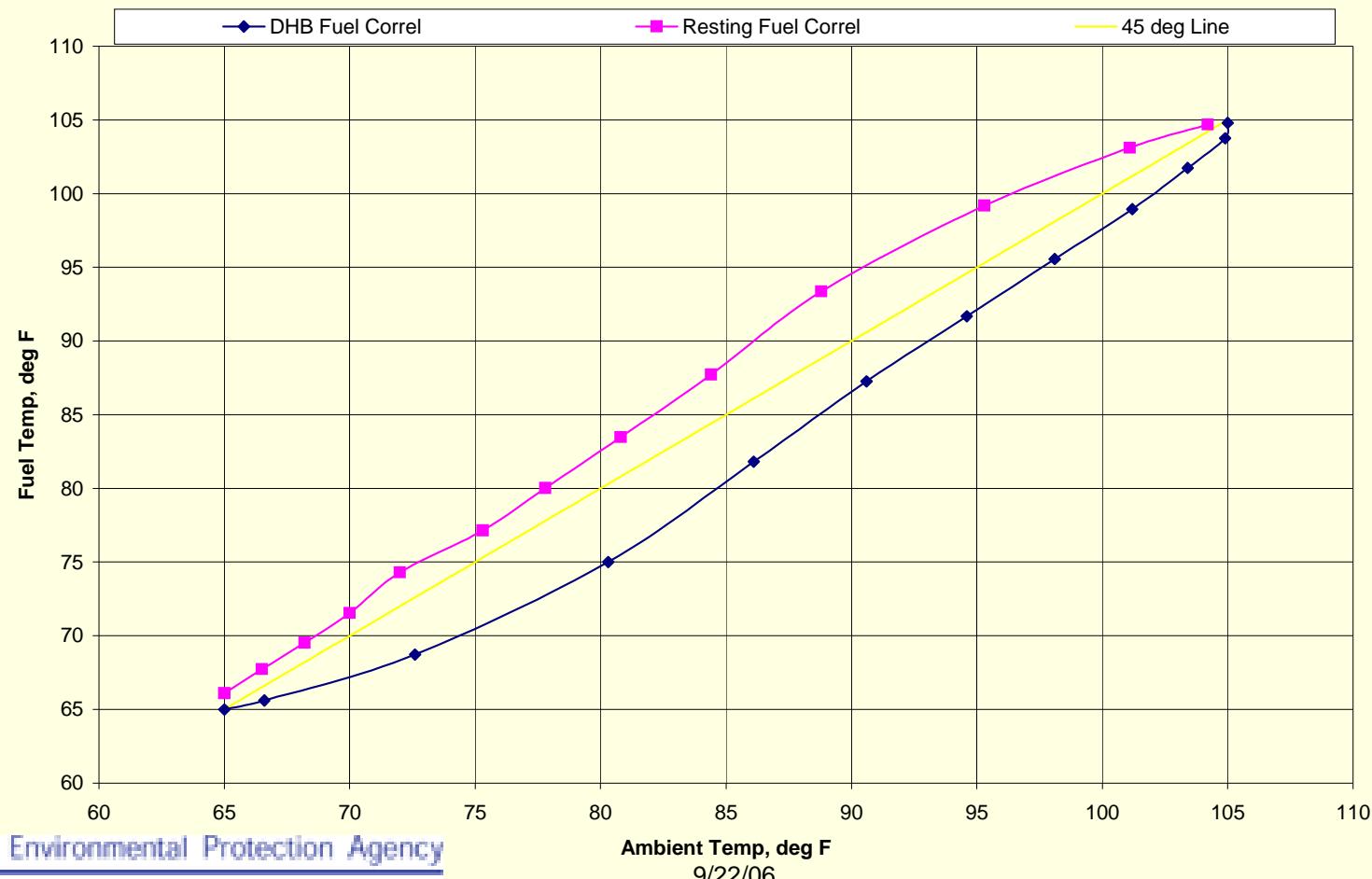
Fuel Temperature, Garage



Fuel Tank Temperatures, Sun



Diurnal Fuel-Ambient Temp Cross-correlation



Cross Correlate Resting Loss

